42278

Potential Applicable or Relevant and Appropriate Requirements

Operable Unit No 7—Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203)

Final Report

April 25, 1994

U S Department of Energy
Rocky Flats Site
Golden, Colorado

ADMIN RECORD

A-000/-000208

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1 INTRODUCTION

Operable Unit (OU) No 7 is one of 16 OUs located at the Rocky Flats site in Jefferson County, Colorado Each OU is made up of a number of individual hazardous substance sites (IHSSs) OU 7 comprises the Present Landfill (IHSS 114), the Inactive Hazardous Waste Storage Area (IHSS 203), and the East Landfill Pond and adjacent spray evaporation areas

As a result of the production of nuclear weapon components, processing of radioactive substances, and fabrication of metals, hazardous substances have been released at the Rocky Flats site A Phase I Resource Conservation and Recovery Act (RCRA) facility investigation/remedial investigation (RFI/RI) was conducted at OU 7 in 1992 and 1993 The Phase I RFI/RI was conducted to characterize the site physical features, describe contaminant sources, and determine the nature and extent of contamination in soils resulting from such releases Data obtained during the Phase I RFI/RI, along with existing data, were to be used to begin developing and screening remedial alternatives and estimate the risks to human health and the environment posed by contaminant sources within OU 7 A Phase II RFI/RI was subsequently planned to characterize the nature and extent of contamination in surface water, groundwater, and air and evaluate contaminant migration pathways

These activities were initiated pursuant to an Interagency Agreement (IAG) among the U S Department of Energy (DOE), the U S Environmental Protection Agency (EPA), and the Colorado Department of Health (CDH) dated January 22, 1991 (DOE 1991) The IAG program developed by DOE, EPA, and CDH addresses RCRA and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) issues that pertain to the site CDH is the lead regulatory agency at the site

Prior to completion of the Phase I RFI/RI and initiation of Phase II, the focus of investigations at OU 7 changed as a result of the adoption of the presumptive remedy strategy for streamlined site characterization and site remediation by DOE, CDH, and EPA Source containment is the designated presumptive remedy for municipal landfills (EPA 1993a) The containment presumptive remedy consists of the following elements institutional controls, a landfill cap, landfill gas collection, source area groundwater control, and leachate collection and treatment, if necessary This streamlined approach, which is consistent with Colorado Hazardous Waste Act

(CHWA) closure requirements supported by guidance in the National Contingency Plan (NCP) and recent EPA guidance for landfills (EPA 1991, EPA 1993a, and EPA 1993b), eliminates the need for initial identification and screening of alternatives during the feasibility study and allows for acceleration of the schedule to implement remedial actions and achieve final closure As a result of this strategy, the Phase I RFI/RI report and comprehensive baseline risk assessment are no longer required Data needed for the design of the presumptive remedies, an assessment of the nature and extent of groundwater contamination, and a focused risk assessment will be collected following the sampling and analysis plan included in the draft Technical Memorandum Revised Work Plan, Operable Unit No 7–Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203) (DOE 1994) Fieldwork will be followed by preparation of an interim measure/interim remedial action (IM/IRA) decision document and finally, implementation of the IM/IRA

1.1 Purpose of Report

This Potential Applicable or Relevant and Appropriate Requirements report for OU 7 presents legal requirements, guidance for developing remedial alternatives, and a framework for determining the health and risk-based limits for remedial action

1 2 Organization of Report

Section 1 presents background information describing the IHSSs and associated areas that make up OU 7, the legal authority for developing applicable or relevant and appropriate requirements (ARARs) at Rocky Flats, and a general discussion of how ARARs are identified This section also presents how potential ARARs should be developed at OU 7 and introduces the process to identify potential ARARs Section 2 discusses potential chemical-specific ARARs, including numerical standards for groundwater, soils, and air Section 3 identifies all potential location-specific ARARs and potential location-specific ARARs that were excluded because of site-specific factors Section 4 addresses potential action-specific ARARs that drive the remedial process Sections 2 through 4 also contain tables listing the potential ARARs identified for each section

Supporting data are included in the appendices to the report Appendix A includes all identified potential contaminants of concern (PCOCs) and the corresponding potential ARAR or guidance to be considered (TBC) identified for each substance Appendix B

contains a letter from the state of Colorado historic preservation officer indicating that OU 7 lacks sufficient cultural or historical value to be regulated under federal and state laws designed to protect these values

1.3 Background

In applying ARARs to OU 7, it is important to determine why they apply to remedial activity at OU 7 and how ARARs are generally developed This subsection identifies the legal authority for applying ARARs to OU 7, defines how ARARs are identified, and specifies how ARARs fit into the remedial process

1 3 1 Legal Authority

Pursuant to the IAG, remedial investigations at Rocky Flats must comply with all applicable RCRA and CERCLA requirements (DOE 1991) As part of the RFI/RI process, CERCLA requires that federal facility remedial actions comply with all ARARs This document identifies potential ARARs and other TBCs for OU 7 Identified ARARs will be used to develop remedial alternatives and to create a framework for determining the health and risk-based limits for remedial action The summary of potential ARARs and TBCs is based on current federal and state health and environmental regulations and guidance

1 3 2 Developing ARARs

CERCLA Section 121(d), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires that, at a minimum, any remedial or removal action achieve overall protection of human health and the environment and comply with ARARs (unless waived) Laws included under this ARARs umbrella include all federal environmental laws and state standards more stringent than their federal counterpart State regulations promulgated under federally authorized programs are considered federal requirements (EPA 1990a) As Rocky Flats is a DOE facility, DOE orders apply with the same force as applicable federal regulations (EPA 1989)

Laws and regulations identified as ARARs are either applicable or relevant and appropriate Applicable requirements are those "cleanup standards, standards of control, or other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental, or facility siting law that specifically addresses a hazardous substance, pollutant, contaminant,

remedial action, location, or other circumstance at a CERCLA site" (40 Code of Federal Regulations [CFR] Section 300 5) Relevant and appropriate requirements are defined as "those standards that, while not 'applicable' to a hazardous substance, pollutant, contaminant, remedial action, location, or circumstances at a CERCLA site, addresses problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site" In determining whether a statute is well suited to the site, EPA has identified factors to be used when comparing CERCLA with the proposed statute to judge their similarity

- Purpose of the requirement
- Medium regulated or affected by the requirement
- Substances regulated by the requirement
- Actions or activities regulated by the requirement
- Any variances, waivers, or exemptions of the requirement
- Type of place regulated
- Type and size of structure or facility regulated
- Any consideration of use or potential use of affected resources in the requirement (40 CFR Section 300 400[g][2])

Onsite actions must comply only with the substantive aspects of ARARs, only offsite activities must adhere to both substantive and administrative requirements As activities at OU 7 do not have offsite consequences, no administrative requirements are identified

OU 7 consists of the Present Landfill, the Inactive Hazardous Waste Storage Area, the East Landfill Pond, and spray evaporation areas adjacent to the pond Results of the Phase I RFI/RI reveal that the nature of contamination at the Inactive Hazardous Waste Storage Area cannot be differentiated from that found at the Present Landfill Because ARARs issues for the Inactive Hazardous Waste Storage Area are subsumed into those that apply to the Present Landfill, no separate ARARs will be identified for the Inactive Hazardous Waste Storage Area

There are three types of ARARs chemical-specific, action-specific, and location-specific This division, prescribed by EPA, is a convenient way to categorize regulations in a way that ties them to the remedial process Laws such as occupational safety standards are not ARARs because they are action requirements that apply to activities regardless of the remedation method selected The following sections identify potential ARARs for OU 7 by type of requirements

In addition to ARARs, TBCs are identified where appropriate TBCs are advisories, criteria, or guidance that may be useful in developing CERCLA remedies (40 CFR Section 300 400[g][3]) TBCs may be used to supplement promulgated standards when the meaning of those standards is ambiguous or when they do not address a particular situation

2. CHEMICAL-SPECIFIC ARARS

Chemical-specific ARARs identify acceptable limits for defining an amount or concentration of a chemical that may be present in the environment These standards usually take the form of health-based or risk-based numerical limitations that restrict ambient concentrations of various chemical substances above a threshold level Chemical-specific ARARs are used to determine action levels and remediation goals (40 CFR Section 300 730[d]) Table 2-1 identifies potential chemical-specific ARARs and the reasons for including them Appendix A presents a series of tables listing numeric cleanup standards based on potential chemical-specific ARARs for all PCOCs at OU 7

2 1 Groundwater and Surface Water

One major area of concern for OU 7 is the potential for leachate from the landfill to migrate into groundwater and surface water supplies Offsite water supplies downgradient of OU 7 are not likely to become contaminated from landfill leachate because of the existing landfill containment structures and the engineered embankment for the East Landfill Pond Nevertheless, because the potential for contamination cannot be foreclosed, it is important to identify numeric standards that may apply to cleanup actions at OU 7

2 1 1 Groundwater

EPA guidance directs that cleanup actions presume that groundwater be considered a potential source of drinking water unless site-specific factors indicate otherwise Because site-specific factors rendering drinking water standards inappropriate have not been identified, Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs), non-zero SDWA maximum contaminant level goals (MCLGs), and RCRA groundwater protection standards have been identified as potential ARARs It is recognized that if MCLGs are deemed relevant and appropriate for setting cleanup levels then MCLs will become superfluous However, both standards are listed because they are both potential ARARs

Colorado general standards for groundwater protection and MCLs for drinking water have also been identified as ARARs Colorado groundwater standards list narrative

Table 2-1
Chemical-Specific ARARs Identified

Law/Regulation	Citation	Description	ARAR Designation	Comments
Federal Laws				
Safe Drinking Water Act	42 USC § 300f			
Safe Drinking Water Act Maximum Contaminant Levels (MCLs)	40 CFR § 141	Represent maximum exposure limits for public water consumption	Relevant and appropriate	Groundwater and surface water are potential sources of drinking water
Safe Drinking Water Act Maximum Contaminant Level Goals (MCLGs)	40 CFR § 141	Health based guidelines for water contaminants established at levels at which no known or anticipated adverse effects on the health of persons occur and which allow an adequate margin of safety	Relevant and appropriate	Not applicable because OU 7 is not a public water supply Non-zero MCLGs are generally relevant and appropriate are considered according to the circumstances of the release and in cases involving multiple contaminants or pathways involving cumulative risk above 10^{-4}
Clean Air Act	42 USC § 7401, *et seq*			
Hazardous Air Pollutants	40 CFR Part 63	Lists new hazardous air pollutants Regulations for this part have not yet become final	Relevant and appropriate	Standards have not yet been set However the hazardous air emission standards established for solid waste treatment storage, and disposal facilities may be promulgated prior to the ROD being released See 58 Fed Reg 63,941 63 952 (1993) Proposed regulations initiated before the ROD will be a TBC
National Ambient Air Quality Standards (NAAQS)	40 CFR Part 50	Establishes emission standards for criteria pollutants under NAAQS	Relevant and appropriate	Pending an assessment of potential emissions from the landfill, it is identified as an ARAR
National Emission Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR Part 61	Establishes emission standards for designated hazardous pollutants, including radionuclides from DOE facilities	Applicable	Applicable to radionuclides at DOE facilities 40 CFR § 61 92 sets a maximum radiation dose limit of 10 mrem/yr for members of the public
State Laws				
Colorado Water Quality Control Act	CRS § 25-8-103, -104 -201 to -205			
Classification of Ground Waters	5 CCR 1002-8 § 3 11 4	Identifies use classifications and the criteria used to identify classifications for groundwater	Applicable	General applicability to groundwater sources within the State of Colorado

Law/Regulation	Citation	Description	ARAR Designation	Comments
Ground Water Quality Standards	5 CCR 1002-8 § 3 11 5	Lists narrative and chemical-specific groundwater quality standards	Applicable	General applicability to groundwater sources within the state of Colorado
Basic Standards Applicable to Surface Waters of the State	5 CCR 1002-8 § 3 1 11 and § 3 1 16	§ 3 1 11 identifies narrative standards for sediment and debris and numerical standards for radioactive contaminants, inorganic chemicals, organic chemicals, and metals	Applicable	General applicability to all surface waters in the state of Colorado
Tables	5 CCR 1002-8 § 3 1 16	Numeric standards related to water quality	Applicable	General applicability to all surface waters in the state of Colorado
Regulations for Effluent Limitations	5 CCR 1002-3 § 10 1	Sets effluent limitations for biological oxygen demand, total suspended solids, residual chlorine, pH, oil, and grease	Relevant and appropriate	Applies to areas subject to NPDES permitting Relevant and appropriate to determining acceptable cleanup levels for these substances
Colorado Primary Drinking Water Regulations	5 CCR 1003-5	Colorado standards in compliance with the federal Safe Drinking Water Act § 3 1 2 MCLs for Microbiological Contaminants, § 5 1 1 MCLs for Inorganic Chemicals, § 6 1 1 MCLs for Chlorinated Hydrocarbons and Chlorophenoxys § 6 2 1 MCLs for TTHM, § 6 2 3 Compliance with MCL for Trihalomethanes, § 6 3 1 MCLs for VOCs, § 7 1 1 MCLs for Radium 226, Radium 228 and Gross Alpha Particle Activity in Community Water Systems, and § 7 1 2 MCLs for Beta Particle and Photon Radioactivity from Man-made Radionuclides in Community Water Systems are all identified as potential ARARs	Relevant and Appropriate	Applicable only to public water systems Relevant and appropriate because it is reasonable to anticipate that groundwater supplies surrounding OU 7 will become a public drinking water source

Law/Regulation	Citation	Description	ARAR Designation	Comments
Colorado Air Pollution Prevention and Control Act	CRS § 25-7-101 to -103, -105 to -110			
The Control of Hazardous Air Pollutants (Regulation No 8a)	5 CCR 1001-10	Presently lists HAPs standards that run parallel to federal requirements under the old NESHAPs program MACT standards under the new HAPs program will probably be promulgated here	Varies	Those pollutants presently listed under this regulation under the old NESHAPs program are not ARARs because the landfill does not emit them However in response to the new federal HAPs program under the Clean Air Act Amendments of 1990 Colorado added an additional 130 HAPs beyond those regulated under the federal program This regulation is listed for planning purposes in the event that Colorado creates standards for one of the pollutants not regulated under federal law before the ROD for OU 7 is signed Proposed regulations, should they arise before the ROD will be regarded as TBC

Definitions

§	section
ARAR	applicable or relevant and appropriate requirement
CCR	Colorado Code of Regulation
CFR	Code of Federal Regulation
CRS	Colorado Revised Statutes
DOE	U S Department of Energy
HAP	hazardous air pollutant
MACT	maximum achievable control technologies
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
mrem/yr	millirems per year
NAAQS	National Ambient Air Quality Standard
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
OU	operable unit
ROD	record of decision
TBC	guidance or recommendation to be considered
USC	United States Code

and chemical-specific standards that apply to groundwater sources within the state Colorado's MCLs for drinking water, although identical to federal requirements, are ARARs because EPA approved those standards for Colorado's implementation of the SDWA

Colorado's site-specific groundwater standards for the Rocky Flats area, on the other hand, have not been identified as ARARs State standards that are not EPA approved must be "promulgated" (40 CFR Section 300 400) This means that they must be legally enforceable (promulgated pursuant to state procedural requirements and contain specific enforcement provisions) and be applicable to all remedial situations, not just CERCLA sites Colorado's site-specific groundwater standards fail this test because they do not apply to all remedial situations In fact, these standards apply criteria only to Rocky Flats Clearly they have not been properly promulgated and should not, therefore, be considered an ARAR

2 1 2 Surface Water

OU 7 contains two bodies of surface water No Name Gulch and the East Landfill Pond The existence of these waters implies that ARARs for surface water should be identified

In cases where surface water is an actual or potential source of drinking water, SDWA MCLs will be an ARAR MCLGs may also be considered in the development of remediation goals, where relevant and appropriate Because OU 7 surface water may ultimately contribute to sources of drinking water, SDWA MCLs and MCLGs have been identified as potential ARARs

Colorado has adopted both state-wide and stream-segment-specific standards for the protection of state surface waters State standards for organic compounds and radionuclides exist for all state sources of drinking water and areas requiring protection of aquatic life Those standards that apply to all Colorado surface waters (5 CCR 1002-8 Section 3 1 11) have been identified as a potential ARAR for OU 7 Site-specific standards for bodies of water in and around Rocky Flats have not been identified as an ARAR These standards (5 CCR 1002-8 Sections 3 8 5 and 3 8 6) are not promulgated within the meaning of the NCP because are not generally applicable to all remedial situations Close reading of the regulation suggests that its standards are significantly

more stringent and more developed for the Rocky Flats area than anywhere else in the state These standards have instead been listed as a TBC because the state has not adopted the same level of stringency to all remedial situations described in the requirement, just to this CERCLA site (Rocky Flats) (EPA 1990c)

2 2 Air

OU 7 is a potential source of airborne substances that are regulated under National Ambient Air Quality Standards (NAAQS) and National Emission Standards for Hazardous Air Pollutants (NESHAPs) Airborne substances include particulate matter, lead, volatile organic compounds (VOCs), and radionuclides However, air emissions from the landfill are not likely to trigger any treatment requirements needed to ensure protection of the environment or comply with ARARs because they do not exist at high enough concentrations To confirm this assertion, modeling of landfill-generated gases will be performed to estimate air emissions and make a preliminary assessment of the need to treat landfill gas Until a preliminary assessment determines that air emissions will not trigger any ARARs associated with air quality, they will be included Clean Air Act (CAA) NAAQS criteria pollutant standards and NESHAPs standards for radionuclides have therefore been included as chemical-specific ARARs

Hazardous air pollutant (HAP) emission standards are being issued for the new HAPs identified in the 1990 CAA Amendments These standards have not yet been promulgated for any appropriate source categories However, proposed air emission regulations for non-methane organic compound (NMOC) releases in municipal solid waste landfills have been issued (56 FR 24468 [1991]) These regulations set a threshold limit of 150 megagrams per year of NMOCs by weight before treatment standards are triggered Because these limits are health based and the source category is appropriate, these proposed regulations are relevant and appropriate for determining acceptable NMOC emission limits This proposed standard has therefore been listed as TBCs

2 3 Soil

Chemical-specific requirements for soil contamination do not exist To-date, neither federal nor Colorado law contains comprehensive numerical standards for hazardous constituents in soils Although there are no identified chemical-specific ARARs for soils, there are TBCs that may assist in determining the need for remedial action based

on the levels of soil contamination around the landfill For example, EPA has proposed numerical treatment standards for organic and metal constituents in soil (58 FR 48092, 48097 [1993])

RCRA delisting guidance may also be useful in determining unacceptable levels of hazardous constituents in soils (EPA 1990b) RCRA guidance lists maximum allowed concentrations (MACs) for various hazardous constituents, above which solids containing those wastes are not eligible for delisting Although the guidance states that these levels are not to be used for setting cleanup levels, MACs may be relevant and appropriate for defining a boundary beyond which soils are clearly contaminated These proposed rules are identified as TBCs

3. LOCATION-SPECIFIC ARARS

Location-specific ARARs identify requirements that apply because the site has some special quality related to geography or the presence of a protected resource These requirements may limit the remedial action that may be implemented or create the need for more stringent remedial efforts Table 3-1 lists location-specific ARARs for OU 7

3 1 Historic, Archaeological, and Cultural Resources

Compliance with federal and state laws designed to preserve areas with historical, natural, cultural, or archaeological value requires the identification of cultural resources and prehistoric or historic artifacts located at OU 7 [1] An archaeological and historical study of the Rocky Flats area was conducted in 1989 It included a detailed archaeological, historical, and prehistoric overview of the Colorado foothills and plains area in and around Rocky Flats, a sample survey of Rocky Flats, and an evaluation of whether cultural resources found at Rocky Flats are eligible for inclusion in the National Register of Historic Places (Burney, et al 1989) The study found that the cultural resource site density at Rocky Flats appears to be fairly low While exhibiting some short-terms prehistoric use such as camping and hunting and scattered historic settlement, the rocky terrain and thin soils mitigate against more intense, long-term use of the area The historic preservation officer for the state of Colorado reviewed these findings and concluded that historic sites at Rocky Flats related to agricultural use of the area and railroading are not eligible for inclusion in the National Register of Historic Places The historic preservation officer also concluded that "there will be no effect to significant cultural resources by undertakings proposed in these areas" Appendix B presents a letter stating these conclusions There are, therefore, no ARARs related to cultural or historical values at OU 7

---

[1] Areas and activities of state interest are identified at CRS Section 24-65 1-104, -201, -202, and -204 Additional state authority for historic resource protection comes from Historical, Prehistorical, and Archaeological Resources Act, CRS Section 24-80-401, *et seq* and the State Register of Historic Places Act, CRS Section 24-80 1-101, *et seq* Federal authority granting protections for areas with historic, scientific, prehistoric, archaeological, ecological, or geological value include the National Historic Preservation Act, 16 USC Section 470, the Archaeological and Historic Preservation Act, 16 USC Section 469, the Archaeological Resources Protection Act, 16 USC Section 470aa-11, and the Historic Sites, Buildings, and Antiquities Act, 16 USC Sections 461 - 467

Table 3-1
Location-Specific ARARs Identified

Law/Regulation	Citation	Description	ARAR Designation	Comments
Federal Laws				
Endangered Species Act	16 USC § 1538, 50 CFR Part 17	Ensures that remedial/removal actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify their critical habitats	Applicable	Listed endangered species found around Rocky Flats include the bald eagle Category 2 species found at Rocky Flats include the ferruginous hawk and Preble's meadow jumping mouse The Rocky Flats area supports habitat for many other endangered and category 2 species, but none have been found
Bald and Golden Eagle Protection Act	16 USC § 668a, 50 CFR § 22	Contains permitting requirements to take (kill or destroy habitat), possess, or transport bald (American) and golden eagles their nests, or their eggs anywhere in the United States	Applicable	General applicability Bald eagles have been identified migrating through Rocky Flats Some habitat at Rocky Flats is suitable for nesting
Fish and Wildlife Coordination Act	16 USC § 661 *et seq*	Requires consultation by the federal department or agency proposing or authorizing any modification of any stream or other water body and adequate provision for protection of fish and wildlife resources	Applicable	Applicable because possible remedial action (e g placing the pond water onto the landfill) may affect wildlife that depend upon the pond
Wetlands Assessment	Executive Order 11990 40 CFR Part 6 Appendix A	Federal agencies must prevent, to the extent possible, the adverse impacts of destroying or modifying wetlands and must prevent direct or indirect support of new construction in wetlands if there is a practicable alternative	Applicable	Applicable because riparian areas around the East Landfill Pond have been identified as potential wetland areas
Clean Water Act	33 CFR §§ 320 - 330, 40 CFR § 230	Action to dispose of dredge and fill material in waters of the United States is prohibited without a permit Under CERCLA § 121(e), no permitting is required for onsite actions however, consultation with the U S Army Corps of Engineers remains important	Applicable	Action to drain the East Landfill Pond is a dredging operation within the parameters of the Clean Water Act It remains unclear whether the East Landfill Pond is considered waters of the U S

Law/Regulation	Citation	Description	ARAR Designation	Comments
State Laws				
Colorado Nongame Endangered or Threatened Species Conservation Act	CRS 33-2-101 to -107	Establishes requirements for protection of wildlife	Applicable	Parallels the federal Endangered Species Act In addition to the species identified above, Rocky Flats contains two species of concern in Colorado forktip threeawn and toothcup

Definitions

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulation
CRS	Colorado Revised Statutes
USC	United States Code

3 2 Artificial Wetlands

The OU 7 East Landfill Pond is a potential wetland because it is an area "inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions (CFR Section 328 3[b]) At OU 7, tall marsh occurs on the edge of the East Landfill Pond, short marsh occurs north and south of the pond throughout the spray evaporation areas Cattails and other hydrophytic vegetation surround the East Landfill Pond However, neither the U S Army Corps of Engineers nor EPA has identified the East Landfill Pond as a wetland Until the East Landfill Pond's wetland status is settled, it is premature to exclude laws and regulations pertaining to wetlands from the list of potential ARARs Consequently, the Clean Water Act Section 404 permitting requirements and Executive Order 11990 have been identified as ARARs Should the East Landfill Pond be identified as a wetland, its size, the nature of planned activities, and the amount of disruption to aquatic life all determine the potential need to limit activities, make offsets, or mitigate any threat to the wetland other ways

3.3 Ecological Protection

The Endangered Species Act (ESA), the Bald and Golden Eagle Protection Act, and the Colorado Nongame, Endangered, or Threatened Species Conservation Act have all been identified as ARARs because of the existence of species regulated under those acts in and around Rocky Flats Studies assessing the presence of plant and animal life at Rocky Flats indicate that several regulated species are located at the site though not specifically at OU 7 Bald eagles occur occasionally in the Rocky Flats area during winter months, but no roost areas or nest sites for this species exist at Rocky Flats A pair of peregrine falcons nested approximately 10 kilometers northwest of Rocky Flats in 1991, and this species may occur as a migrant periodically The ferruginous hawk and Preble's meadow jumping mouse, both candidates for listing as a threatened or endangered species under ESA, are present at Rocky Flats Rocky Flats is also potential habitat for many other protected plant and animal species, including the Ute lady's tresses, Colorado butterfly plant, black-footed ferret, white-faced ibis, mountain plover, long-tailed curlew, and swift fox Neither the Rocky Flats site nor OU 7 in particular has been identified as critical habitat for any regulated species However, it is important to address how activities at OU 7 may affect local habitat

4 ACTION-SPECIFIC ARARS

Action-specific ARARs are management, performance, or treatment standards that are triggered by the particular activities that are selected to accomplish a remedy Action-specific requirements do not, in themselves, determine the remedial alternative, rather, they indicate how a selected alternative must be achieved Table 4-1 lists the action-specific ARARs that have been identified for OU 7 Table 4-2 lists standards and other guidance that have been identified as TBC

4 1 Present Landfill

Since the Present Landfill opened in 1968, its operations policies for waste disposal have conformed to applicable state and federal regulations (Rockwell International 1988, CDH 1979) Regular radiation monitoring began in 1973, groundwater monitoring began in 1977 Although the landfill accepted some hazardous waste in years past (that practice ended in 1986), none of the hazardous waste stream categories differs from those found at an ordinary municipal landfill In 1986, the Waste Stream Identification and Characterization (WSIC) program, for example, identified the following hazardous waste stream categories

- Containers filled with paint, solvent, degreasers, and foam polymers
- Rags contaminated with solvents, paint, etc
- Oil and paint filters
- Metal and asbestos shavings (Rockwell International 1986a, 1986b, 1986c, 1986d, and 1987)

As with municipal landfills, the Present Landfill poses little long-term threat to the environment In addition, treatment is impractical because of the size of the landfill and heterogeneity of the waste The Present Landfill is sufficiently similar to a municipal landfill site that guidance applicable to municipal landfills regarding remediation methods is appropriate

Table 4-1
Federal and State Action-Specific ARARs

Law/Regulation	Citation	Description	ARAR Designation	Comments
Federal Laws				
Resource Conservation and Recovery Act	42 USC § 9621 *et seq*			
Criteria for Classification of Solid Waste Disposal Facilities and Practices	40 CFR Part 257	Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable possibility of adverse effects on health or the environment	Relevant and appropriate	Not applicable because it applies to ongoing operations at solid waste disposal facilities (OU 7 is now regulated as an interim status facility under 40 CFR 265) Relevant and appropriate to identifying criteria that may pose a reasonable probability of adverse effect on human health or the environment
Criteria for Municipal Solid Waste Landfills	40 CFR Part 258	Establishes minimum criteria for municipal solid waste landfills to ensure protection to human health and the environment Subpart E Ground Water Monitoring and Corrective Action Subpart F, Closure and Post-Closure Care, and Appendix 1 and 2 are all identified as potential ARARs	Relevant and appropriate	Not applicable because OU 7 is not a municipal site Relevant and appropriate because OU 7 contains wastes typical for a municipal landfill Identified sections relate to post-closure environmental issues
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40 CFR Part 264	Establishes minimum national standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store, and dispose of hazardous waste	Relevant and appropriate	CDH directs that monitoring and post-closure care requirements are relevant and appropriate for detecting contaminant levels near the East Landfill Pond
Corrective Action Management Unit	40 CFR Part 264, Subpart S	Defines the CAMU concept and establishes conditions for its implementation at particular sites	Relevant and appropriate	Not applicable because OU 7 is not a permitted facility It is relevant and appropriate because OU 7 may otherwise meet the conditions for implementation

Law/Regulation	Citation	Description	ARAR Designation	Comments
Interim Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities	40 CFR Part 265	Establishes minimum national standards that define the acceptable management of hazardous waste during the period of interim status and until certification of final closure, or if the facility is subject to post-closure until responsibilities are fulfilled	Applicable	Applicable because OU 7 is an interim status RCRA facility pending closure
Land Disposal Restrictions	40 CFR Part 268	Establishes restrictions for the land disposal of hazardous wastes	Relevant and appropriate	Not applicable because OU 7 remediation does not "place" hazardous wastes outside the area of contamination It is relevant and appropriate because the type of place regulated is sufficiently similar
Clean Water Act	33 USC §§ 1251-1376			
Discharge of Stormwater	40 CFR § 122 21 and § 122 26	Controls point source discharges of stormwater associated with industrial activity including requirements for pollution prevention plans	Relevant and appropriate	Relevant and appropriate because industrial activity includes landfills
Criteria and Standards for the National Pollutant Discharge Elimination System	40 CFR Part 125 Subpart K	Requires that best management practices be maintained by the operator of a system that discharges pollutants directly into the environment and requires that point source discharges be monitored to ensure compliance with effluent discharge limits	Applicable	Applicable through the NPDES Federal Facility Compliance Agreement (FFCA-CWA 90-1)
Atomic Energy Act	42 USC § 2011, *et seq*			
Standards for Protection Against Radiation	10 CFR Part 20	Establishes minimum standards for radioactive waste disposal	Relevant and appropriate	Not applicable because Rocky Flats is not a NRC licensed facility It is relevant and appropriate for its standards to protect the public from radiation exposure and radionuclide contamination of waters and soils

Law/Regulation	Citation	Description	ARAR Designation	Comments
DOE Orders				
General Environmental Protection Program	DOE Order 5400 1	Specifies environmental protection standards applicable to DOE operations	Applicable	Contains broad requirements for environmental monitoring
Environment, Safety and Health Program for Department of Energy Operations	DOE Order 5480 1B	Specifies responsibility of DOE and conditions under which operations are to be curtailed due to risks	Applicable	Applicable as a potential ARAR because onsite remedial activities need to conform to its restrictions
Environmental Protection, Safety and Health Protection Standards	DOE Order 5480 4	Specifies environment and safety requirements for facility construction, operation, and decommissioning, including requirements applicable to DOE and subcontractors	Applicable	Applicable as general standards under which remedial activities must be conducted
Radiation Protection of the Public and the Environment	DOE Order 5400 5	Specifies compliance of DOE and its contractors under Atomic Energy Act radiation protection requirements	Applicable	Contains compliance guidelines for managing residual radioactive material Basic dose limits guidelines and authorized limits for allowable levels of residual radioactive material, and control requirements for radioactive wastes and residues
Radioactive Waste Management	DOE Order 5480 2A	Specifies environmental protection requirements for management of low-level waste	Applicable	Includes general performance objectives and monitoring requirements
State Laws				
Colorado Solid Waste Disposal Sites and Facilities Act	CRS 30-20-100 5 et seq			
Colorado Solid Waste Disposal Sites and Facilities Regulations	6 CCR 1007-2	Establishes solid waste disposal criteria, including the collection, storage, treatment, utilization, processing and final disposition of solid wastes	Relevant and appropriate	Not applicable because OU 7 is not regulated under state standards for solid waste disposal Closure, monitoring, and post-closure maintenance requirements are relevant and appropriate to the Present Landfill because they apply to facilities that are sufficiently similar to OU 7
Hazardous Waste Management Regulations Identification and Listing of Hazardous Waste	40 CFR Part 261	Defines those solid wastes that are subject to regulation as hazardous wastes	Applicable	Characterization of waste at the landfill may determine the selection of a remedy

Law/Regulation	Citation	Description	ARAR Designation	Comments
Standards Applicable to Generators of Hazardous Waste	40 CFR Part 262	Establishes the methodology for determining if a solid waste is a hazardous waste	Applicable	Characterization of waste at the landfill may determine the selection of a remedy
Soil Erosion Dust Blowing Act	CRS 35-72-101 et seq	Creates an actionable duty to all real property owners in the state to prevent soil from blowing to neighboring lands	Applicable	Intended to apply to all lands in the state of Colorado

Definitions

§	section
ARAR	applicable or relevant and appropriate requirement
CAMU	corrective action management unit
CCR	Colorado Code of Regulation
CDH	Colorado Department of Health
CFR	Code of Federal Regulation
CRS	Colorado Revised Statutes
CWA	Clean Water Act
DOE	U S Department of Energy
FFCA	Federal Facility Compliance Agreement
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
OU	operable unit
RCRA	Resource Conservation and Recovery Act
USC	United States Code

Table 4-2
Regulatory and Technical Guidance to be Considered

Guidance Source	Citation	Description	ARAR Designation	Comments
A Guide to Delisting of RCRA Wastes for Superfund Remedial Responses	OSWER 9347 3-09FS September 1990	Circumstances delisting wastes may be appropriate and the procedures for delisting a RCRA hazardous waste as part of a Superfund remedial response	TBC	This guidance document lists maximum allowed concentrations (MACs) for various hazardous constituents above which solids containing those wastes are not eligible for delisting Although the guidance states that these levels are not to be used for setting cleanup levels, MACs may be relevant and appropriate for defining an outer boundary where soil contamination may not exceed that level
Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil	58 FR 48092, 48097 (1993)	Proposed numerical treatment standards for organic and metal constituents in soil	TBC	As it is a proposed regulation it is at most a TBC Its use is relevant and appropriate for setting chemical-specific standards for soil If promulgated, it will become an ARAR
Air Emissions from Municipal Solid Waste Landfills	56 FR 24468 (1991)	Proposed threshold standards for NMOCs at municipal solid waste landfills	TBC	Relevant and appropriate for determining acceptable NMOC limits before triggering the need for additional treatment
Remediation of Contaminated Sediments	EPA/625/6-91/028	EPA approach to developing national sediment quality criteria	TBC	Relevant to determining action levels for contaminated sediment that is exposed when the East Landfill Pond becomes clean closed
Classifications and Numeric Standards South Platte River Basin	5 CCR 1002-8 § 3 8 5, 3 8 6	Numeric standards for the South Platte River Basin Stream segment 4 standards for Big Dry Creek refer to tributaries for North and South Walnut Creek	TBC	No Name Gulch is a tributary of North Walnut Creek
Site-Specific Ground Water Classifications and Water Quality Standards Rocky Flats Area, Jefferson and Boulder Counties	5 CCR 1002-8, § 3 12 7(1) and Tables	Stream-segment-specific water quality standards for unconfined groundwater at the Rocky Flats aquifer	TBC	Identifies stream-specific standards in and around OU 7
Presumptive Remedy for CERCLA Municipal Landfill Sites	EPA Directive No 9355 0-49FS	Containment is the presumptive remedy for CERCLA municipal landfills	TBC	OU 7 is largely a landfill containing a combination of solid and hazardous wastes consistent with characterization as a municipal landfill

Definitions

§	section
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CCR	Colorado Code of Regulation
EPA	U S Environmental Protection Agency
FR	Federal Register
MAC	maximum allowed concentration
NMOC	non methane organic compound
OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
RCRA	Resource Conservation and Recovery Act
TBC	guidance or recommendation to be considered

In accordance with Presumptive Remedy for CERCLA Municipal Landfill Sites, containment is identified as the appropriate strategy for remedial action (EPA 1993a, 1993b) This presumption, consistent with the Superfund Accelerated Cleanup Model, relates to containment of the landfill mass and collection and/or treatment of landfill gas Rocky Flats intends to implement this presumptive remedy for the landfill mass, however, the presumptive remedy strategy is not applicable to the East Landfill Pond or the adjacent spray evaporation areas

4.2 East Landfill Pond and Spray Evaporation Areas

Action-specific ARARs for sediments underlying the East Landfill Pond, soils underlying adjacent spray evaporation areas, and the pond water itself depend upon the types and levels of contaminants If the waste can be best characterized as hazardous leachate typical for a municipal landfill, then municipal solid waste disposal requirements (found under 40 CFR Parts 257 and 258) may be appropriate Areas exhibiting sufficient hazardous waste characteristics are regulated under more stringent land disposal restrictions (40 CFR Part 268) Even if the wastes are subject to hazardous waste land disposal restrictions, site circumstances may permit an alternative option Instead of sending the waste to a permitted treatment, storage, and disposal (TSD) facility or incinerating, it may be placed onto the landfill mass before the final cap is emplaced This third option is an example of the corrective action management unit (CAMU) concept (58 FR 8658 [1993]) Regulations outlining these disposal options have been identified as action-specific ARARs

4 3 Air Monitoring

Clean Air Act monitoring requirements are included because of their importance in monitoring regulated air pollutants under state and federal law Although emission limitations and control technology guidance for hazardous air pollutants (40 CFR 63) have not yet been issued, it is important to monitor the presence of these substances should standards be promulgated and to ensure that any remedial action chosen is generally protective of human health and the environment Should an assessment of landfill gases reveal that OU 7 air emissions pose no threat to the environment, then these requirements may become unnecessary

4 4 Radiation Protection

Standards for the management of radioactive materials are appropriate ARARs at OU 7 due to the presence of radionuclides in the landfill mass and leachate from the landfill The standards offer performance objectives for closure, environmental monitoring requirements, and criteria for waste characteristics that would safely permit near-surface disposal of radioactive wastes Identified ARARs include the following DOE orders

- Radiation Protection of the Public and the Environment, DOE Order 5400 1
- Radioactive Waste Management, DOE Order 5480 2A

Regulations applicable to Nuclear Regulatory Commission (NRC)-licensed facilities are not identified as ARARs in compliance with DOE policy (DOE 1993) DOE orders generally contain substantive standards borrowed from similar federal regulations Those portions of federal laws that are appropriate for DOE sites have, therefore, already been built into DOE order requirements Any requirements that are not contained in those orders are not "well suited" to DOE sites and waste management operations

5 REFERENCES

Burney, M S , S F Mehls, and M P Grant 1989 An Archaeological and Historical Survey of Selected Parcels Within the Department of Energy, Rocky Flats Plant, Northern Jefferson County, Colorado Burney and Associates

DOE 1991 Federal Facility Agreement and Consent Order (Interagency Agreement [IAG] U S DOE, U S EPA, and CDH), U S Department of Energy, Washington, D C January 22

DOE 1993 Nuclear Regulatory Commission (NRC) Low-Level Radioactive Waste Regulation and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Applicable or Relevant and Appropriate Requirements (ARARs) U S Department of Energy Office of Environment EH-231 March 29

DOE 1994 Technical Memorandum, Revised Work Plan, Operable Unit No 7– Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203) Draft Report U S Department of Energy, Rocky Flats Site, Golden, Colorado April 15

EPA 1988 CERCLA Compliance with Other Laws Manual Interim Final U S Environmental Protection Agency EPA/540/G-89 006 August

EPA 1989 CERCLA Compliance with Other Laws Manual Part II U S Environmental Protection Agency EPA/540/G-89/009 August

EPA 1990a National Oil and Hazardous Substances Pollution Contingency Plan U S Environmental Protection Agency 55 FR Section 8666, 8742 March 8

EPA 1990b A guide to Delisting of RCRA Wastes for Superfund Remedial Responses U S Environmental Protection Agency OSWER 9347 3-09FS

EPA 1990c National Oil and Hazardous Substances Pollution Contingency Plan U S Environmental Protection Agency 55 Federal Register Section 8666, 8746 March 8

EPA 1991 Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites U S Environmental Protection Agency EPA/540/P-91/001 February

EPA 1993a Presumptive Remedy for CERCLA Municipal Landfill Sites U S Environmental Protection Agency EPA Directive No 9355 0-49 FS EPA/540/F-93/035 September

EPA 1993b Superfund Accelerated Cleanup Bulletin, Presumptive Remedies for Municipal Landfill Sites U S Environmental Protection Agency PB93-963269 February

Rockwell International 1986a Waste Stream Identification, Rocky Flats Plant, Area 1 Rockwell International, Rocky Flats Plant, Golden, Colorado W O 2029-13-04-0001

Rockwell International 1986b Draft Waste Stream Identification Survey, Area 2 Rockwell International, Rocky Flats Plant, Golden, Colorado W O 2029-13-04-0001

Rockwell International 1986c Draft Waste Stream Identification Survey, Area 3 Rockwell International, Rocky Flats Plant, Golden, Colorado W O 2029-13-04-0001

Rockwell International 1986d Draft Waste Stream Identification Survey, Area 4 Rockwell International, Rocky Flats Plant, Golden, Colorado W O 2029-13-04-0001

Rockwell International 1987 Recommendations on Disposal of Waste Streams Rockwell International, Rocky Flats Plant, Golden, Colorado

Rockwell International 1988 Present Landfill Closure Plan, U S Department of Energy Rocky Flats Plant Rockwell International, Rocky Flats Plant, Golden, Colorado

33 CFR 328 3(b) Definition of Waters of the United States, 33 Code of Federal Regulation, Section 328 3(b) 1994

40 CFR 61 National Emission Standards For Hazardous Air Pollutants, 40 Code of Federal Regulation, Part 61 1994

40 CFR 63 National Emission Standards for Hazardous Air Pollutants for Source Categories, 40 Code of Federal Regulation, Part 63 1994

40 CFR 268 Hazardous Waste Management System - Land Disposal Restrictions, 40 Code of Federal Regulation, Part 268 1992

40 CFR 300 5 National Oil and Hazardous Substances Pollution Contingency Plan - Definitions, 40 Code of Federal Regulation, Section 300 5 1992

40 CFR 300 400(g)(2) National Oil and Hazardous Substances Pollution Contingency Plan - Hazardous Substance Response, 40 Code of Federal Regulation, Section 300 400(g)(2) 1992

40 CFR 300 400(g)(3) National Oil and Hazardous Substances Pollution Contingency Plan - Hazardous Substance Response, 40 Code of Federal Regulation, Section 300 400(g)(3) 1992

40 CFR 300 730(d) National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulation, Section 300 730(d) 1992

56 FR 24468 Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources Municipal Solid Waste Landfills EPA May 30, 1991

58 FR 8658 Corrective Action Management Units and Temporary Units, Corrective Action Provisions Under Subtitle C, 58 Federal Register 8658 1993

58 FR 48092 Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil, 58 Federal Register, 48092 1993

Table A-1
OU 7 Potential Chemical-Specific ARARs and TBCs
Groundwater Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No.	Type[3]	Federal Standards		State Standards CDH WQCC Groundwater Quality Standards[4]						
					Statewide	Site-Specific					
			SDWA[5] Maximum Contaminant Level	RCRA Subpart F PQL[6]	Table A[4]	Table 1 Human Health	Table 2 Secondary (Drinking)	Table 3 Agriculture	Table 5 Chronic	Table 6 Radionuclides: Woman Creek[7]	Table 6 Radionuclides: Walnut Creek[7]
N as Nitrate+Nitrite	10-28-6	A	10 000[8]					100,000			
Aluminum	7429-90-5	M	50 to 200[7,8]					5,000			
Antimony	7440-36-0	M	6[8]								
Arsenic	7440-38-2	M	50[9]	50		50		100			
Barium	7440-39-3	M	2 000[10]	1 000		1 000					
Beryllium	7440-41-7	M	4[8]					100			
Cadmium	7440-43-9	M	5[8]	10		10		10			
Calcium	7440-70-2	M									
Chromium	7440-47-3	M	100[8]	50		50		100			
Cobalt	7440-48-4	M						50			
Copper	7440-50-8	M	1,000[7]/1,300[11]				1,000	200			
Iron	7439-89-6	M	300[7]				300	5,000			
Lead	7439-92-1	M	15[11]	50		50		100			
Lithium	7439-93-2	M						2,500			
Magnesium	7439-95-4	M									
Manganese	7439-96-5	M	50[7]				50	200			
Mercury	7439-97-6	M	2[8]	2		2		10			
Molybdenum	7439-98-7	M									
Nickel	7440-02-0	M	100[8]					200			
Potassium	7440-09-7	M									
Selenium	7782-49-2	M	50[8]	10		10		20			
Silver	7440-22-4	M	50[7]	50		50					
Sodium	7440-23-5	M									
Strontium	7440-24-6	M									
Thallium	7440-28-0	M	2[8]								
Tin	7440-31-5	M									
Vanadium	7440-62-2	M						100			
Zinc	7440-66-6	M	5 000[7]				5,000	2,000			

Table A-1
OU 7 Potential Chemical-Specific ARARs and TBCs
Groundwater Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No	Type[3]	Federal Standards		State Standards CDH WQCC Groundwater Quality Standards[1]						
					Statewide	Site-Specific[2]					
			SDWA Maximum Contaminant Level	RCRA Subpart F Limit[4]	Table A[1,5]	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 5 Chronic	Table 6 Radionuclides: Woman Creek	Table 6 Radionuclides: Walnut Creek
Americium 241 (pCi/L)	14596-10-2	R									
Cesium 137 (pCi/L)	10045-97-3	R	[12]								
Gross Alpha (pCi/L)	10-79-7	R	15[9 13]			156				7	11
Gross Beta (pCi/L)	10-81-1	R	50[9 14 12]			7				5	19
Radium 226+228 (pCi/L)		R	5[9 12]		5					5	5
Strontium89+90 (pCi/L)	11-10-9	R	a[14 12]								
Tritium (pCi/L)	10028-17-8	R	20,000[9 14 12]		20,000					500	500
Uranium 235 (pCi/L)	15117-96-1	R									
Uranium 238 (pCi/L)	7440-61-1	R									
1 4-Dichlorobenzene (Para)	106-46-7	SV	75[9]		75						
2 4 5-Trichlorophenol	95-95-4	SV									
2 4-Dimethylphenol	105-67-9	SV									
2-Chloronaphthalene	91-58-7	SV									
2-Methylphenol	95-48-7	SV									
4-Methylphenol	106-44-5	SV									
4-Nitrophenol	100-02-7	SV									
Acenaphthene	88-32-9	SV									
Benzoic Acid	65-85-0	SV									
bis(2-Ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	117-81-7	SV	6[8]								
Diethylphthalate	84-66-2	SV									
Di-n-butylphthalate	84-74-2	SV									
Fluorene	86-73-7	SV									
Naphthalene	91-20-3	SV									
Pentachlorophenol	87-86-5	SV	1[10]		200						
Phenanthrene	85-01-8	SV									
Phenol	108-95-2	SV				1					

Table A-1
OU 7 Potential Chemical-Specific ARARs and TBCs
Groundwater Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No.	Type[3]	Federal Standards		State Standards CDH WQCC Groundwater Quality Standards[1]						
					Statewide	Site-Specific[2]					
			SDWA Maximum Contaminant Level	RCRA Subpart F Limit[4]	Table A[1,5]	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 5 Chronic	Table 6 Radionuclides: Woman Creek	Table 6 Radionuclides: Walnut Creek
Vinyl Chloride	75-01-4	V	2[9]		2						
1 1,1-Trichloroethane	71-55-6	V	200[9]		200						
1 1 2-Trichloroethane	79-00-5	V	5[8]		3				0 6		
1,1-Dichloroethane	75-34-3	V									
1,1-Dichloroethene	75-35-4	V	7[9]		7						
1 2-Dichloroethane	107-06-2	V	5[9]		0 4						
1 2-Dichloroethene (total)	540-59-0	V									
1 2-Dichloropropane	78-87-5	V	5[8]		0 56						
2-Butanone	78-93-3	V									
2-Hexanone	591-78-6	V									
4 Methyl-2-pentanone	108-10-1	V									
Acetone	67-64-1	V									
Benzene	71-43-2	V	5[9]		1						
Bromodichloromethane	74-97-2	V	<100[15 9]		0 3						
Bromoform	75-25-2	V	<100[15 9]		4						
Carbon Disulfide	75-15-0	V									
Carbon Tetrachloride	56-23-5	V	5[9]		0 3						
Chlorobenzene	108-90-7	V	100[8]		100						
Chloroethane	75-00-3	V									
Chloroform	67-66-3	V	<100[15 9]		6				0 19		
Ethyl Benzene	100-41-4	V	700[8]		680						
Methylene Chloride	75-09-2	V	5[8]								
Tetrachloroethene	127-18-4	V	5[8]		5				0 8		
Toluene	108-88-3	V	1 000[8]		1,000						
Trichloroethene	79-01-6	V	5[9]		5						
Xylenes (total)	1330-20-7	V	10,000[8]								

Table A-1
OU 7 Potential Chemical-Specific ARARs and TBCs
Groundwater Quality Standards
(All values are reported in µg/L unless otherwise noted)

[1]CDH/Water Quality Control Commission The Basic Standards for Ground Water 3 11 0 (5 CCR 1002 8) January 5 1987 effective November 30 1991 statewide radioactive standards listed in 3 11 5(C)(2)
[2]CDH/Water Quality Control Commission Classifications and Water Quality Standards for Ground Water 3 12 0 effective January 31 1994
[3]Type abbreviations are A=anion B=bactena C=cation D=dioxin E=element FP=field parameter H=herbicide IN=inorganic M=metal P=pesticide PP=pesticide/PCB R=radionuclide SV=semivolatile V=volatile
[4]NCP 40 CFR 300 NCP Preamble 55 FR 8764 CERCLA Compliance with Other Laws Manual EPA/540/G 89/006 August 1988 40 CFR 264 94
[5]Where the standard is below (more stringent than) the PQL the PQL is interpreted to be compliance level
[6]EPA National Primary and Secondary Drinking Water Regulations 40 CFR Parts 141 142 143 Final Rule effective July 30 1992 (56 Federal Register 3526 January 30 1991)
[7]Secondary maximum contaminant level TBCs
[8]EPA National Primary Drinking Water Regulations 40 CFR 141 and 142 Final Rule effective January 17 1994
[9]EPA National Primary and Secondary Drinking Water Regulations 40 CFR 141 and 40 CFR 143 (as of May 19 1990)
[10]EPA National Primary and Secondary Drinking Water Regulations 40 CFR Parts 141 142 143 Final Rule effective January 1 1993 (56 FR 30266 July 1 1991)
[11]EPA Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper 40 CFR 141 and 142 (56 FR 26460 June 7 1991) and 57 FR 28785 (June 29 1992) effective December 7 1992 MCLGs effective November 6 1991 Action level in 10% or less of tap samples for small and medium-sized systems
[12]Average annual concentration of beta particles and photon reactivity cannot exceed 4 millirem/year dose equivalent.
[13]Value for gross alpha excludes uranium
[14]If both strontium-90 and tritium are present the sum of their annual dose equivalents to bone marrow shall not exceed 4 millirem/yr
[15]Total trihalomethanes chloroform bromoform bromodichloromethane dibromochloromethane

Definitions

ARAR applicable or relevant and appropriate requirement
CAS Chemical Abstracts Service
CDH Colorado Department of Health
pCi/L picocuries per liter
RCRA Resource Conservation and Recovery Act
SDWA Safe Drinking Water Act
TBC guidance or recommendation to be considered
µg/L micrograms per liter
WQCC Water Quality Control Commission

Table A-2
OU 7 Potential Chemical-Specific ARARs and TBCs
Federal Surface Water Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No.	Type[2]	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level	CWA AWQC for Protection of Aquatic Life		CWA AWQC for Protection of Human Health	
					Acute Value	Chronic Value	Water and Fish Ingestion	Fish Consumption Only
N as Nitrite	7632-00-0	A		1,000[3]				
Antimony	7440 36-0	M	6[4]		9,000	1,600	146	45,000
Arsenic	7440 38-2	M	50[5]				0 0022	0 0175
Barium	7440-39-3	M	2,000[6]				1,000	
Beryllium	7440-41-7	M	4[4]		130	5 3	0 0068[7]	0 117[7]
Cadmium	7440-43-9	M	10[5]	5[3]	3 9[8]	1 1[8]	10	
Calcium	7440-70-2	M						
Cesium	7440-46-2	M						
Chromium	7440-47-3	M	50[5]	100[3]				
Cobalt	7440-48-4	M						
Copper	7440 50-8	M	1 000[9 5]	1,300[10]	18[8]	12[8]		
Iron	7439 89-6	M	300[9 5]			1,000	300	
Lead	7439-92-1	M	50[5]	15[10]	82[8]	3 2[8]	50	
Lithium	7439-93-2	M						
Magnesium	7439-95-4	M						
Manganese	7439-96-5	M	50[9 5]				50	100
Molybdenum	7439-98-7	M						
Nickel	7440-02-0	M	100[4]		1,400[8]	160[8]	13 4	100
Potassium	7440-09-7	M						
Selenium	7782-49-2	M	10[5]	50[3]	20[11]	5[11]	10	
Silver	7440-22-4	M	50[5]	100[9 3]	4 1[8]	0 12	50	
Sodium	7440-23-5	M						
Strontium	7440-24-6	M						
Thallium	7440-28-0	M	2[4]		1 400[12]	40[12]	13	48
Tin	7440-31-5	M						
Vanadium	7440-62-2	M						
Zinc	7440-66-6	M	5,000[9 5]		120[8]	110[8]		
Americium 241 (pCi/L)	14596-10-2	R						
Gross Alpha (pCi/L)	10-79-7	R	15[5 13]					
Gross Beta (pCi/L)	10-81-1	R	50[5 14 15]					

Table A-2
OU 7 Potential Chemical-Specific ARARs and TBCs
Federal Surface Water Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No.	Type[2]	SDWA Maximum Contaminant Level[1]	SDWA Maximum Contaminant Level	CWA AWQC for Protection of Aquatic Life[1]		CWA AWQC for Protection of Human Health[1]	
					Acute Value	Chronic Value	Water and Fish Ingestion	Fish Consumption Only
Strontium 89+90 (pCi/L)	11-10-9	R	[5 14 15]					
Tritium (pCi/L)	10028-17-8	R	20,000[5 14 15]					
Uranium-235 (pCi/L)	15117-96-1	R						
Uranium-238 (pCi/L)	7440-61-1	R						
2 4-Dimethylphenol	105-67-9	SV			2,120[12]			
2-Methylnaphthalene	91-57-6	SV						
4-Methylphenol	106-44-5	SV						
Acenaphthene	88-32-9	SV			1,700[12]	520[12]		
bis(2-Ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	117-81-7	SV	6[4]					
Dibenzofuran	132-64-9	SV						
Diethylphthalate	84-66-2	SV					350 000	1 800,000
Di-n-butylphthalate	84-74-2	SV					35 000	154 000
Fluorene	86-73-7	SV						
Naphthalene	91-20-3	SV			2,300[12]	620[12]		
Phenanthrene	85-01-8	SV						
Vinyl Chloride	75-01-4	V	2[5]				2[7]	525[7]
1 1-Dichloroethane	75-34-3	V						
1 2-Dichloroethane	107-06-2	V	5[5]		118 000	20,000	0 94[7]	243[7]
2-Butanone	78-93-3	V						
2-Hexanone	591-78-6	V						
4-Methyl-2-pentanone	108-10-1	V						
Acetone	67-64-1	V						
Benzene	71-43-2	V	5[5]		5,300		0 66[7]	40[7]
Carbon Disulfide	75-15-0	V						
Chloroethane	75-00-3	V						
Chloromethane	74-87-1	V						
Ethylbenzene	100-41-4	V		700[3]	32,000[12]		1,400	3 280
Methylene Chloride	75-09-2	V	5[4]					
Tetrachloroethene	127-18-4	V		5[3]	5 280[12]	840[12]	0 80[7]	8 85[7]

Table A-2
OU 7 Potential Chemical-Specific ARARs and TBCs
Federal Surface Water Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No.	Type[2]	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level	CWA AWQC for Protection of Aquatic Life[1]		CWA AWQC for Protection of Human Health[17]	
					Acute Value	Chronic Value	Water and Fish Ingestion	Fish Consumption Only
Toluene	108-88-3	V		1,000[3]	17 500[12]		14,300	424 000
Trichloroethene	79-01-6	V	5[5]		45,000[12]	21,900[12]	2 7[7]	80 7[7]
Vinyl Acetate	108-05-4	V						
Xylenes (total)	1330-20-7	V		10,000[3]				

Table A-2
OU 7 Potential Chemical-Specific ARARs and TBCs
Federal Surface Water Quality Standards
(All values are reported in µg/L unless otherwise noted)

[1]EPA Quality Criteria for Protection of Aquatic Life 1986
[2]Type abbreviations are A=anion B=bacteria C=cation D=dioxin E=element H=herbicide IN=inorganic FP=field parameter M=metal P=pesticide PP=pesticide/PCB R=radionuclide SV=semivolatile V=volatile
[3]EPA National Primary and Secondary Drinking Water Regulations 40 CFR Parts 141 142 and 143 Final Rule effective July 30 1992 (56 Federal Register 3526 1/30/1991)
[4]EPA National Primary Drinking Water Regulations 40 CFR 141 and 142 Final Rule Effective January 17 1994
[5]EPA National Primary and Secondary Drinking Water Regulations as of May 1990 40 CFR 141 and 40 CFR 143
[6]EPA National Primary and Secondary Drinking Water Regulations 40 CFR Parts 141 142 and 143 Final Rule (56 FR 30266 7/1/1991) effective 1/1/1993
[7]Human health criteria for carcinogens reported for three risk levels Value presented is the 10 5 risk level
[8]Hardness dependent criteria calculated assuming 50 mg/L calcium carbonate
[9]Secondary maximum contaminant level TBCs
[10]EPA Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper 40 CFR 141 and 142 (56 FR 26460 6/7/1991) effective 12/7/92 MCLGs effective 11/6/91 Action level in 10% or less of tap samples for small and medium-sized systems
[11]EPA National Ambient Water Quality Criteria for Selenium 1987
[12]Criteria not developed value presented is lowest observed effects level (LOEL)
[13]Value for gross alpha excludes uranium
[14]Average annual concentration of beta particles and photon radioactivity cannot exceed 4 millirem/year dose equivalent
[15]If both strontium 90 and tritium are present the sum of their annual dose equivalents to bone marrow shall not exceed 4 millirem/year

Defintions

AWQC	Ambient Water Quality Criteria
ARAR	applicable or relevant and appropriate requirement
CAS	Chemical Abstracts Service
CWA	Clean Water Act
pCi/L	picocuries per liter
SDWA	Safe Drinking Water Act
TBC	guidance or recommendation to be considered
µg/L	micrograms per liter

Table A-3
OU 7 Potential Chemical-Specific ARARs and TBCs
Statewide and Basin (CDH/WQCC) Surface Water Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No	Type[1]	Statewide Standards[2]								South Platte River Basin Stream Standards[3]				
			Human Health Carcinogens/ Noncarcinogens[4,6]		Aquatic Life[5]		Tables I,II,III[6] Aquatic Life[6,7]					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
			Water Supply	Water and Fish	Acute Value	Chronic Value	Acute Value[4]	Chronic Value[4]	Agricultural Standard[4,9]	Domestic Water Supply[10,6]	Organics[11,12] Table 1A	Acute[12] Value	Chronic[12] Value	Woman Creek	Walnut Creek
N as Nitrite	7632-00-0	A					SS	SS	10 000	1,000		500	1,000		
Antimony	7440-36-0	M								14					
Arsenic	7440-38-2	M					360	150	100	50		50			
Barium	7440-39-3	M								1,000					
Beryllium	7440-41-7	M							100	0 0076			4		
Cadmium	7440-43-9	M					TVS	TVS	10	10		TVS	TVS		
Calcium	7440-70-2	M													
Cesium	7440-46-2	M													
Chromium	7440-47-3	M													
Cobalt	7440-48-4	M													
Copper	7440-50-8	M					TVS	TVS	200	1 000		(23)TVS	(23)TVS		
Iron (DIS)	7439-89-6	M								300			300 (3)		
Iron (TR)	7439-89-6	M						1,000					(13 200) 1000		
Lead	7439-92-1	M					TVS	TVS	100	50		(28)TVS	(28)TVS		
Lithium	7439-93-2	M													
Magnesium	7439-95-4	M													
Manganese (DIS)	7439-96-5	M						1,000		50			(560) 50 (3)		
Manganese (TR)	7439-96-5	M							200				1,000		
Molybdenum	7439-98-7	M													
Nickel	7440-02-0	M					TVS	TVS	200			TVS	TVS		
Potassium	7440-09-7	M													
Selenium	7782-49-2	M					135	17	20	10			1 00E+01		
Silver	7440-22-4	M					TVS	TVS		50		TVS	TVS		
Sodium	7440-23-5	M													
Strontium	7440-24-6	M													
Thallium	7440-28-0	M						15		0 012					
Tin	7440-31-5	M													

Table A-3
OU 7 Potential Chemical-Specific ARARs and TBCs
Statewide and Basin (CDH/WQCC) Surface Water Quality Standards
(All values are reported in µg/L unless otherwise noted)

Parameter	CAS No.	Type[1]	Statewide Standards[2]								South Platte River Basin Stream Standards[3]				
			Human Health Carcinogens/ Noncarcinogens[4,6]		Aquatic Life[5]		Tables I, II, III[6]					Physical, Biological, Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life[5]								
			Water Supply	Water and Fish	Acute Value	Chronic Value	Acute Value[4]	Chronic Value[4]	Agricultural Standard[6,7]	Domestic Water Supply[10,8]	Organics[11,12] Table 1A	Acute[12] Value	Chronic[12] Value	Woman Creek	Walnut Creek
Vanadium	7440-62-2	M													
Zinc	7440-66-6	M					TVS	TVS	2,000	5 000		(350) TVS	(350) TVS		
Americium 241 (pCi/L)	14596-10-2	R													
Gross Alpha (pCi/L)	10-79-7	R												7	11
Gross Beta (pCi/L)	10-81-1	R												5	19
Strontium 89+90 (pCi/L)	11-10-9	R													
Tritium (pCi/L)	10028-17-8	R	20 000 (10)											500	500
Uranium 235 (pCi/L)	15117-96-1	R													
Uranium 238 (pCi/L)	7440-61-1	R													

Table A-3
OU 7 Potential Chemical-Specific ARARs and TBCs
Statewide and Basin (CDH/WQCC) Surface Water Quality Standards
(All values are reported in µg/L unless otherwise noted)

[1]Type abbreviations are A=anion B=bacteria C=cation IN=inorganic FP=field parameter H=herbicide M=metal P= pesticide PP=pesticide/PCB R=radionuclide SV=semivolatile
[2]CDH/WQCC Colorado Water Quality Standards 3 1 0 (5 CCR 1002 8)
[3]5 CCR 1002 8 Section 3 8
[4]In the absence of specific numeric standards for non naturally occurring organics the narrative standard is interpreted as zero with enforcement based on practical quantification levels (PQLs) as defined by CDH/WQCC or EPA
[5]Where the standard is below (more stringent than) the PQL the PQL is interpreted to be the compliance level
[6]Table I = physical and biological parameters Table II = inorganic parameters Table III = metal parameters
Values in Tables I II and III for recreational uses cold water biota and domestic water supply are not included
[7]Metals for aquatic life use are stated as dissolved unless otherwise specified
[8]All are 30-day standards except for nitrate+nitrite nitrate and cyanide
[9]Metals for agricultural and domestic use are stated as total recoverable (TR) unless otherwise specified
[10]Ammonia sulfide chloride sulfate copper iron manganese antimony beryllium selenium thallium and zinc are 30 day standards all others are 1-day standards
[11]Site specific organic standards to segment 4 and 5 of Big Dry Creek otherwise organic standards in reference (a) 3 1 11
[12]Numbers in parentheses are temporary modifications to stream standards effective until 4/1/96 for non naturally occuring organics the narative standard free from toxics" (section 3 1 11(1)(d) shall be interpreted and applied in accordance with the provisions of section 3 12 consistently for surface and ground waters

Defintions

ARAR	applicable or relevant and appropriate requirement
CAS	Chemical Abstracts Service
CDH	Colorado Department of Health
DIS	dissolved
pCi/L	picocuries per liter
TBC	guidance or recommendation to be considered
TR	total recoverable
TVS	table value standard (hardness dependent)
µg/L	micrograms per liter
WQCC	Water Quality Control Commission

Table A-4
OU 7 Potential Chemical-Specific TBCs
Soil Contaminant Criteria
(All values are in mg/kg unless otherwise noted)

[1]Type abbreviations are A=anion B=bacteria C=cation D=dioxin E=element FP=field parameter H=herbicide IN=inorganic M=metal P=pesticide PP= pesticide/PCB R=radionuclide SV=semivolatile V=volatile

[2]EPA Guidance 9347 3-09FS A Guide to Delisting of RCRA Wastes for Superfund Remedial Responses Based on Health based 10-6 risk developed for delisting hazardous wastes and waste residuals

[3]Value derived from Colorado Radiation Control Rules and Regulations 1985 as amended 1990

Definitions

CAS	Chemcal Abstracts Service
mg/Kg	milligrams per kilogram
mg/L	milligrams per liter
pCi/g	picocuries per gram
ppm	parts per million
TBC	guidance or recommendation to be considered

NOTICE:

The following page had not been numbered for this document when originally printed, but it appears in the List of Appendices as Appendix B. If replacement pages are distributed, they will be microfilmed and included in the Administrative Record file.

The Administrative Record Staff

COLORADO HISTORICAL SOCIETY

The Colorado History Museum 1300 Broadway Denver Colorado 80203-2137

RECEIVED
DOE RFO
MAIL ROOM

92 AUG 31 P 3 31

August 25, 1992

Frazer R. Lockhart
Director
Environmental Restoration Division
Department of Energy
P O Box 928
Golden, Colorado 80402-0928

Re Rocky Flats Cultural Resource Survey

Dear Mr Lockhart

This office has reviewed the report entitled "Cultural Resources Class III Survey of the Department of Energy Rocky Flats Plant, Northern Jefferson and Boulder Counties, Colorado" by Dames and Moore

The sites located on the Rocky Flats parcel are related to the agricultural use of the area and to railroading The sites have lost their integrity due to the destruction and deterioration of the structures and have little archaeological potential Track was never laid on the railroad line These sites are not related to events important in history We therefore concur that sites 5JF722 through 5JF744, 5JF761, 5JF762 and 5JF766 are not eligible to the National Register of Historic Places

We also find that 5JF79 and 5JF217, which were revisited during this survey, are not eligible These sites are rock piles that are common in the area and appear to be related to the clearance of fields for agriculture

The undeveloped portions of Rocky Flats have been inventoried to a Class III level and no further inventory is necessary in these areas We find that there will be no effect to significant cultural resources by undertakings proposed in these areas

If we may be of further assistance please contact Jim Green at 866-4674

Sincerely,

for
James E Hartmann
State Historic Preservation Officer

SHS
20